



## Installation Instructions for KPMI Part No.: 20-23950

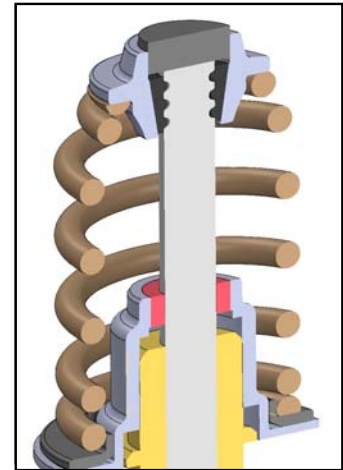
### Harley Davidson • Milwaukee-Eight Engines (& CVO's\*) • 2017-'25

#### Rocker-Shim Conversion Racing Spring Kit

\*2023-2025 CVO's check valve lift to determine compatibility with KPMI spring kits

The KPMI Rocker Shim Conversion Spring Kit for the Milwaukee-8 utilizes a beehive spring and a lightweight retainer that houses a standard Ø9.5mm hardened steel shim. The rocker arm rides directly on the shim surface and the 9.5mm diameter significantly increases the allowable rocker wipe area. This increase in wipe area provides the ability to utilize larger lift cams, that previously were unable to run on a 6mm valve stem. Additionally, the rocker shim thickness can be varied to adjust effective stem protrusion.

This system is intended to be installed by an experienced engine builder, as there are modifications that must be preformed and setup variables that must be determined for optimum performance and longevity.



#### A) 20-23950 Kit Includes:

<u>Qty</u>	<u>Application</u>	<u>Description</u>
8 - Pcs	Intake / Exhaust	HT Steel Retainers
8 - Prs	Intake / Exhaust	Chrome Silicon Beehive Springs
8 - Pcs	Intake / Exhaust	HT Steel Basewashers**
8 - Pcs	Intake / Exhaust	Viton Tophat Seals
8 - Pcs	Intake / Exhaust	9° Triple Bead Keepers
8 - Pcs	Intake / Exhaust	3.5mm Thick Rocker Shims

\*\*Note: These basewashers are designed to fit on top of either the OEM or KPMI Tophat seals provided in this kit.

#### B) Rocker Shim System Notes

**Note 1: MODIFICATION NECESSARY.** KPMI recommends roughly 0.100" of shim counterbore depth in the retainer. This distance is measured prior to the installation of the rocker shim, from the tip of the valve to the top surface of the retainer. To achieve this measurement, **the valve is intended to be "tipped" / shortened by 0.035"** (See Figure 1, page 2) Note: removing .035" should leave roughly .040" of tip length above the last groove on an OEM style groove. KPMI doesn't recommend less than .040" of tip length.

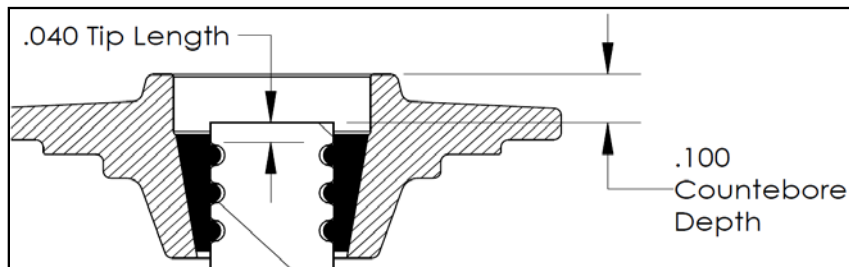


Figure 1) Installation assembly after valve tip modifications.



**Note 2:** The 3.5mm (.138”) thick included rocker shim, combined with the reduction of .035” from tipping the valve will increase the “effective” valve stem protrusion above the cylinder head by roughly .100”. This increase is necessary to correct rocker geometry with larger lift cams. This is a recommended starting place, but because rocker geometry is highly dependent on many variables, adjustment can and should be made. Any combination of different tipping length (mentioned above), different shim thickness or sinking the valves will effect this parameter.

### C) Installation Heights - Intake / Exhaust

- 1. Installed Height ..... **1.495"-1.505"**
- 2. Seat Pressure ..... **85 lbs**
- 3. Open Pressure at 0.625" lift ..... **280 lbs**
- 4. Max Valve Lift ..... **0.625"**

NOTE: Each spring has a slightly tighter wind to the coils on one end. Install with tighter coils down, towards cylinderhead.

### C) Notes:

- 1. The difference between the installed height and the coil bind height is considered “Free-Travel”

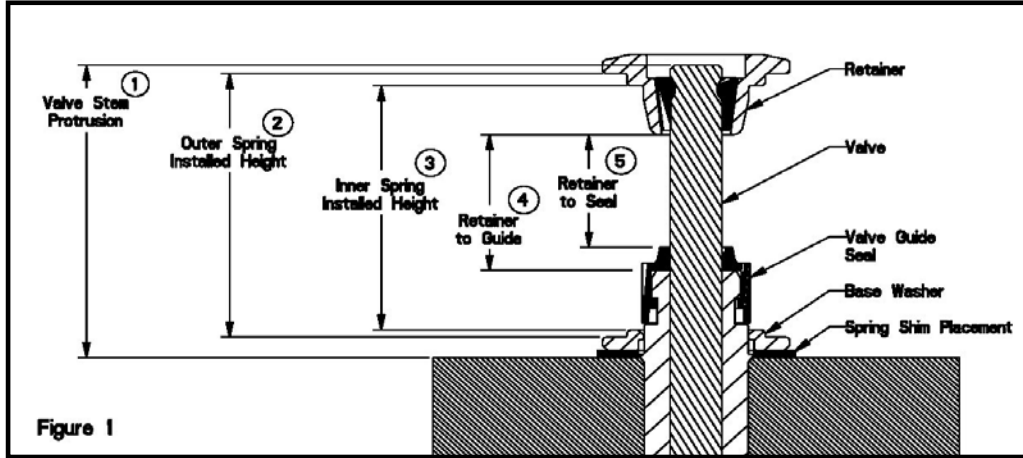
*The coil bind height is determined by compressing the spring(s) with the Retainer and Basewasher in place (a vice can be used for this operation). Once springs are compressed, measure the distance between the Retainer and Basewasher where the Outer Spring contacts them.*

- 2. Free-travel should always be gross valve lift +0.060” for safe operation.
- 3. Retainer-to-Seal / Guide clearance should also be gross valve lift +0.060” for safe operation.
- 4. Failure to check valve train clearances can result in serious damage to an engine

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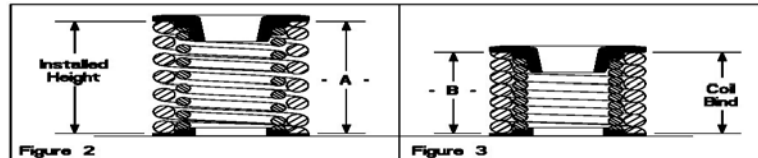
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# TECH TIPS



## Valve Train Terminology

1. Stem Protrusion is measured from the tip of the valve stem to the cylinder head. See Figure 1.
2. Outer spring installed height is measured where the outer spring contacts the Retainer and Basewasher when assembled (See Figure 1).
3. Inner spring installed height is measured where the inner spring contacts the Retainer and Basewasher when assembled (See Figure 1).
4. Retainer-to-Guide clearance is the distance between the Valve Guide (w/o the seal) and the bottom of the Retainer, with the Valve in the closed position (See Figure 1 and Notes 3 & 4).
5. Retainer-to-Seal clearance is the distance between the Valve Stem Seal and the bottom of the Retainer, with the Valve in the closed position (See Figure 1 and Notes 3 & 4).



## Installed Height

1. In Figure 2 the installed height is measured from where the Outer Spring contacts the Retainer and the Basewasher. This measurement is taken when the Valve, Basewasher, Retainer, and Keepers are assembled in the cylinder head.

## Coil Bind / Solid Height:

1. In Figure 3 the coil bind height is determined by compressing the Spring(s) with the Retainer and Basewasher in place (a vice can be used for this operation). Once springs are compressed, measure the distance between the retainer and basewasher where the Outer Spring contacts them.

## Notes:

1. The difference between the installed height and the coil bind height is considered "Free-Travel"
2. Free-travel should always be gross valve lift +0.060" for safe operation.
3. Retainer-to-Seal / Guide clearance should also be gross valve lift +0.060" for safe operation.
4. Failure to check valve train clearances can result in serious damage to an engine.